REMARKS

Amended Specification

Applicant has amended certain portions of the specification to further clarify important aspects of Applicant's invention. Any changes and/or additions are fully supported by the original specification and/or by priority patent applications and issued patents of said inventor which were referenced and incorporated by the original application.

Amended Claims

Applicant has amended claims 1-4, 6-10, and 12-20. Any changes and/or additions are fully supported by the original specification and/or by priority application(s) and patent(s) of said inventor which were referenced and incorporated by the original specification.

Claim Rejections under 35 USC § 112

Applicant has addressed Examiners rejection of claims 6-8 and 13-15 for being indefinite by removing the word "preferably." Applicant respectfully submits that amended claims 6-8 and 13-15 are no longer indefinite.

Claim Rejections under 35 USC § 103

The rejection of claims 1-20, under 35 USC §103(a), as being unpatentable over U.S. Patent 5,149,368 issued to Liu et al ("Liu") as contended by Examiner has been addressed. Applicant has amended claims 1-4, 6-10 and 12-20 and respectfully submits that there is now insufficient basis for regarding Applicant's amended claims 1-20 as being obvious in light of Liu.

Applicant respectfully asserts that Applicant's amended claims 1-20 are not obvious in light of Liu for several important reasons. Liu's patent is directed to a bio-active cement

comprising tetracalcium phosphate, a setting agent consisting essentially of acidic citrate, and water, wherein the ratio of cementing powder to setting reagent lies between 2:1 and 15:1. Liu's tetracalcium phosphate based composition varies considerably from Applicant's mono potassium (MKP) based refractory composition comprising: KH_2PO_4, a metal oxide and a calcium containing compound. A number of important differences are discussed below, including Applicant's use of KH_2PO_4 as the metal phosphate (See, Applicant's original claim 17, amended claims 1-20) which was not addressed by Examiner.

One of the most obvious differences between Liu's composition and that of Applicant is Liu's teaching of a calcium citrate as an essential part of its disclosed composition. The importance of calcium citrate (or citrate salt) to Liu's invention is evident in its specification and claims. Since calcium citrate is central to Liu's composition it would not be obvious to remove it from Liu's composition to form a composition similar to that disclosed by Applicant. Even if one skilled in the art did remove the citrate from Liu's composition, Applicant's composition would still be unobvious.

Examiner suggests that it would be obvious for one skilled in the art to combine several compounds briefly disclosed by Liu (presented in a laundry list of possible pH adjusters and inert fillers) to achieve that which is claimed by Applicant. As discussed below, Applicants respectfully disagrees. "The mere fact that the prior art may be modified in a manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fitch, 972 F.2d 1260 and 1266(1992)." The modifications necessary to change Liu's invention to that of Applicant's is never disclosed or even suggested, and would require undue experimentation.

Applicant amended the composition of claim 1 to comprise: KH_2PO_4, a metal oxide and

a calcium containing compound. The importance of KH_2PO_4 to the invented composition is obvious in light of Applicant's original and amended specification, original claim 17 and amended claims 1-17. While Liu mentions the possibility of using potassium phosphate (among various other compounds) as a pH modifier in its specification, Liu specifically limits the potassium phosphate in its claims to K_3PO_4 and K_2HPO_4. (See Liu Claim 5).

Furthermore, Liu teaches potassium phosphate only as a pH modifier added to the setting agent, not as an essential component of the overall composition. Since Liu teaches a setting agent consisting essentially of acidic citrate the pH modifier (modifying the setting agent) as read in light of specification and claims would be limited to a small portion of the overall composition. (See, Liu Co. 3 lines 50-60, and claims 1-14) The courts have held that the signal 'consisting essentially of' allows for the presence of only small amounts of components outside the designated (composition). See, Talbert Fuel Sys. Patents Co. V. Unocal Corp., 275 F.3d 1371, 2002 U.S. App. Therefore, Liu is properly read as teaching the use of potassium phosphate in only small portions of the setting agent, and even smaller portions of the entire compound.

On the other hand, MKP is a salient part of Applicant's invention and is present in large amounts for example between 20-80 (or 25-75) weight percent, preferably between 40-65 weight percent (see Applicant's original and amended specification and claims). Applicant's exemplary compositions make clear that Applicant's composition is based on potassium phosphate, preferably MKP. (See, Applicant's original specification page 7 "preferably mono potassium phosphate.") It would not be obvious for a skilled artisan to create a composition based on MKP when MKP is not specifically disclosed and is furthermore specifically omitted (teaching against) from a list of possible pH modifiers. (See, Liu claim 5). Potassium

phosphate in general is only briefly disclosed by Liu among a long list of potential pH modifiers to be used in limited amounts.

Examiner also suggests that Liu's disclosure of MgO as one of a myriad of cited inert fillers makes the use of metal oxides in Applicant's composition obvious. Given the number of fillers Liu teaches it would not be obvious to use a metal oxide like MgO in the amounts taught by Applicant's, especially in combination with MKP and in the weight ratios disclosed by Applicant. It is apparent from Applicant's specification, examples and claims that a metal oxide (preferably MgO) is critical to Applicant's invention. See, Applicant's original specification pages 4-7, page 7, paragraph 5 and 6, and amended claims 1-20. Furthermore, Liu disclosed the use of MgO as an inert filler and not as an active ingredient. Applicant respectfully asserts that it would not be obvious to make a inert filler taught by Liu an active portion of a new binder.

Liu also fails to teach a weight percentage ratio between KH_2PO_4 and the metal oxide as disclosed by Applicants original and amended claims. The taught weight percent ratio is an important aspect of Applicant's disclosure as is clear from Applicant's amended specification and original and amended claims. (See, Jennings v. Brenner, Comr. Pats., 150 USPQ 167) Liu fails to teach or even suggest the importance of a weight ratio between KH_2PO_4 and a metal oxide (i.e. Mgo). Liu emphasizes a ratio but it is between tetracalcium phosphate and the acidic citrate. Clearly if Liu believed the ratio between MKP and a metal oxide was important Liu would have discussed or at least suggested it.

Applicant's amended claim 9 teaches using $Ca_{10}(PO_4)_6(OH)_2$ as the calcium containing compound. This is in direct contrast to the Liu patent which teaches away from the use of hydroxyapatite, Liu stating the "hydroxyapatite and beta-tricalcium phosphate, because of their slow dissolution rate, cannot form a good setting cement . . ." The only hydroxyapatite that Liu

teaches is a fully decomposed hydroxyapatite. The use of $Ca_{10}(PO_4)_6(OH)_2$ in the invented composition is supported by priority application No. 09/602,067, now patent No. 5,333,821 submitted by instant invention and incorporated by reference in the present application.

Several other differences also exist including Applicant's used of calcium silicate and silicon dioxide.

In order to come up with Applicant's amended claims composition, a skilled artisan would have to (1) eliminate a key component of Liu's composition, (2) combine two compounds not essential to Liu's invention one of which was briefly referred to (MgO), the other not specifically mentioned (MKP), and make those two compounds the basis of a new refractory product with a completely different use than disclosed in Liu. Applicant respectfully submits that Applicant's composition would be unobvious even to a skilled artisan in the art. A skilled artisan would be required to perform an inordinate amount of experimentation in order to achieve Applicant's composition, with no reasonable assurance of success.

Applicant respectfully asserts that amended claims 1-20 are unobvious in light of Liu and are in condition for allowance.

Provisional Double Patenting Rejection

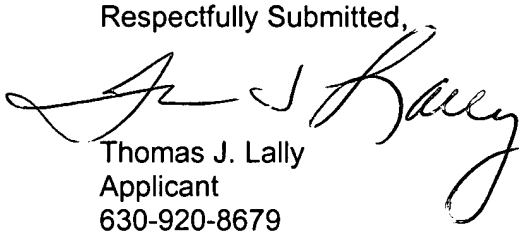
The provisional obviousness-type double patenting rejection over co-pending Application No. 10/338,425 has been addressed. Applicant has filed a terminal disclaimer to obviate the double patent rejection, the disclaimer being filed on September 1, 2004.

The obviousness-type double patenting rejection over U.S. Patent No. 6,533,821 has been addressed. Applicant has filed a terminal disclaimer to obviate the double patenting rejection, the disclaimer being filed with the previous amendment filed on September 1, 2004. Applicant respectfully asserts that the double patenting objections have been overcome.

CONCLUSION

For the foregoing reasons, Applicant respectfully requests that the Examiner allow Amended claims 1-20, as indicated on the attached complete listing of claims.

Respectfully Submitted,



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630-920-8679
Dated: December 15, 2004

Attachment(s)

COMPLETE LISTING OF CLAIMS, INCORPORATING AMENDMENTS AND REVISIONS IN RESPONSE TO THE OFFICE OF ACTION DATED OCT. 20, 2004 FOR SERIAL NUMBER 10/685,214

1. (Currently Amended) A refractory comprising: a. 20-80 wt. % of KH_2PO_4 ~~a metal phosphate~~; b. 15-60 wt. % of a metal oxide; and c. ~~2-20~~ 0.5-25 wt% of a calcium containing compound.

2. (Currently Amended) ~~A~~ The refractory as described in claim 1, wherein the ~~metal phosphate is an alkali metal or alkali earth metal phosphate~~ calcium containing compound is selected from the group consisting of: $Ca_{10}(PO_4)_6(OH)_2$, $Ca_3(PO_4)_2$, $CaSiO_3$ and combinations thereof.

3. (Currently Amended) The refractory as recited in claim 1 ~~further comprising a component selected from the group consisting of calcium silicate and silicon dioxide,~~ wherein the metal oxide is selected from the group consisting of MgO, FeO, Fe_2O_3, FeO_3, Fe_2O_4 and combinations thereof.

4. (Currently Amended) The refractory as recited in claim 1 wherein ~~further comprising calcium silicate, wherein the calcium silicate is present at between 0.5-15 wt. % of the refractory composition.~~ the metal oxide is MgO.

5. (Original) The refractory as recited in claim 1 further comprising silicon dioxide, wherein the silicon dioxide is present at between 0.5-15 wt. % of the refractory composition.

6. (Currently Amended) The refractory as recited in claim 1 wherein the refractory is ~~preferably~~ between 40 and 65 wt. % KH_2PO_4 ~~metal phosphate~~.

7. (Currently Amended) The refractory as recited in claim 1 ~~wherein the refractory is~~

~~preferably between 25-50% metal oxide,~~ further comprising a filler or mixture of fillers.

8. (Currently Amended) The refractory as recited in claim 1 wherein ~~the refractory is preferably between 4 and 15 wt. % tricalcium phosphate.~~ the calcium containing compound is $Ca_{10}(PO_4)_6(OH)_2$.

9. (Currently Amended) The refractory as recited in claim 1 wherein the wt. % ratio between ~~metal phosphate~~ KH_2PO_4 and the metal oxide is between 2:0.5 and 1:1.

10. (Currently Amended) The refractory as recited in claim 1 wherein the refractory composition is mixed with up to [[2]] 30 wt. % water to form an activated slurry.

11. (Original) The refractory as recited in claim 1 further comprising a setting retarder.

12. (Currently Amended) A refractory comprising: ~~a. 20-80 wt. % of a~~ mono potassium phosphate; b. ~~15-60 wt. % of a~~ MgO; and c. ~~2-20% of~~ a calcium containing compound, wherein the wt. % ratio between the mono potassium phosphate and the MgO is between 2:0.5 and 1:1. ~~tricalcium phosphate~~.

13. (Currently Amended) The refractory as recited in claim 12 wherein the calcium containing compound is: tricalcium phosphate, calcium silicate, hydroxyapatite or combinations thereof. ~~refractory is preferably between 40-65 wt. % potassium phosphate.~~

14. (Currently Amended) The refractory as recited in claim 12 wherein the refractory is ~~preferably between 25-50 wt. % MgO.~~ mixed with up to 30 wt. % water to form an activated slurry.

15. (Currently Amended) The refractory as recited in claim 1 wherein the ~~refractory is preferably between 4-15 wt. % tricalcium phosphate .~~ the wt. % ratio between KH_2PO_4 and the metal oxide is between 1:0.5 and 1:1.

16. (Currently Amended) The refractory as recited in claim 1 wherein the refractory is between 25-50 wt. % MgO. ~~wherein the refractory composition is mixed with up to 20 wt. % water to form an activated slurry.~~

17. (Currently Amended) The refractory as described in claim 1, ~~wherein the metal phosphate is mono potassium phosphate.~~ further comprising a filler selected from the group consisting of: mullite, alumina, sand, clay, kyanite, bauxite, aluminum oxide, silicon dioxide, chrome oxide, iron oxide, microsilicates and mixtures thereof.

18. (Currently Amended) A refractory consisting essentially of: ~~comprising~~: a. 20-80 wt. % of KH_2PO_4 ~~a metal phosphate~~; b. 15-60 wt. % of a metal hydroxide or metal oxide; and c. ~~2-20~~ 0.5-25 wt. % of ~~tricalcium phosphate.~~ a calcium containing compound selected from the group consisting of $Ca_{10}(PO_4)_6(OH)_2$, $Ca_3(PO_4)_2$, $CaSiO_3$ and combinations thereof.

19. (Currently Amended) The refractory as described in claim 18, ~~wherein the metal phosphate is mono potassium phosphate~~ wherein the refractory composition is mixed with up to 30 wt. % water or aqueous solution to form an activated slurry.

20. (Original) The refractory as described in claim 18, wherein the metal [[hydr]]oxide is MgO ~~selected from the group consisting of: $Al(OH)_3$ and $Zr(OH)_4$~~.

AMENDED SPECIFICATION TEXT
INCORPORATING AMENDMENTS
IN RESPONSE TO OFFICE ACTION DATED OCT. 20, 2004
FOR SERIAL NO. 10/685,214

1. The paragraph starting with the line "Detailed Description of the Invention" on Page 5 of Applicant's original specification should read as follows:

Detailed Description of the Invention

The present invention is a moldable and castable material, thereby making it ideal as refractory. The refractory composition is comprised of an alkali metal or alkali earth metal phosphate, preferably KH_2PO_4, a metal oxide (or hydroxide), preferably MgO, and a calcium containing compound like tricalcium phosphate, $Ca_{10}(PO_4)_6(OH)_2$, $CaSiO_3$, or combinations thereof. ~~Preferably an alkali earth metal phosphate.~~ The ratio between the metal phosphate (i.e. KH_2PO_4) and the metal oxide (i.e. MgO) preferably being between approximately 2:0.5 and 1:1.

2. The Paragraph starting with the line "Formulation II*" on Page 5 of Applicant's original specification should read as follows:

Formulation II*

Potassium phosphate	(technical grade-30 microns)	61 percent
Magnesium Oxide	(technical grade- 30 microns)	31 percent
~~Tricalcium Phosphate~~ $Ca_{10}(PO_4)_6(OH)_2$		8 percent